

Name of the Student: _____**Max. Marks : 20 Marks****Time : 20 Minutes**

Mark Schemes

Q1.

Question Number	Answer	Additional guidance	Mark
(i)	kinetic (1)	only (adding another incorrect alternative negates)	(1) AO 2 1

Question Number	Answer	Additional guidance	Mark
(ii)	any one of increase the speed (of spinning) (1) increase the mass / weight (of the flywheel) (1)	accept (idea of) faster ignore make it bigger	(1) AO 2 1

Q2.

Question Number	Answer	Acceptable answers	Mark
(i)	electrical	electric	(1)

Question Number	Answer	Acceptable answers	Mark
(ii)	chemical		(1)

Q3.

Question Number	Answer	Acceptable answers	Mark
(i)	20 (J)	200 – 180 (even if calculated value from this is incorrect)	(1)

Question Number	Answer	Acceptable answers	Mark
(ii)	(changed to) {thermal energy / heat}	dissipated (lost) to {surroundings / motor / air / atmosphere} sound / noise reject if kinetic, light or chemical is mentioned	(1)

Question Number	Answer	Acceptable answers	Mark
(iii)	$\frac{180}{200} \times 100$ (1) 90 (%) (1)	award full marks for correct answer with no working $\frac{180}{200}$ 0.9, 9/10 Or [100 – (20/200)] % not needed but if a unit is given then maximum score is 1	(2)

Question number	Indicative content	Mark
*	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p style="text-align: center;">AO2,AO3</p> <p>Non-renewable sources of energy</p> <p style="padding-left: 40px;">trend: less used/decrease in use (between 2012 and 2019)</p> <p>fossil fuels</p> <p style="padding-left: 40px;">coal, gas, oil</p> <p style="padding-left: 40px;">are running out / finite resource / sustainability argument</p> <p style="padding-left: 40px;">produce carbon dioxide/ sulphur dioxide/ greenhouse gases (when burned) in power stations</p> <p style="padding-left: 40px;">cause pollution/ smoke particles /damage to the environment</p> <p style="padding-left: 40px;">causes climate change / global warming</p> <p style="padding-left: 40px;">production of greenhouse gases needs to be reduced (for Britain to become carbon neutral)</p>	(6) AO2, AO3

	<p>nuclear fuels</p> <p>no carbon dioxide produced</p> <p>radioactive waste produced</p> <p>safety concerns</p> <p>Renewable sources of energy</p> <p>trend: more used /increase in use (between 2012 and 2019)</p> <p>renewable and non-renewable about equally used from 2019</p> <p>solar, wind, hydroelectric, tidal, geothermal, wave and biomass</p> <p>never run out / are sustainable</p> <p>do not produce carbon dioxide/ greenhouse gases (except biomass)</p> <p>slow down climate change / global warming</p>	
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Level	Mark	Descriptor
	0	<ul style="list-style-type: none"> No awardable content
Level 1	1–2	<ul style="list-style-type: none"> Interpretation and evaluation of the information attempted but will be limited with a focus on mainly just one variable. Demonstrates limited synthesis of understanding. (AO3) The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2)
Level 2	3–4	<ul style="list-style-type: none"> Interpretation and evaluation of the information on both variables, synthesising mostly relevant understanding. (AO3) The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2)
Level 3	5–6	<ul style="list-style-type: none"> Interpretation and evaluation of the information, demonstrating throughout the skills of synthesising relevant understanding. (AO3) The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2)

Level	Mark	Additional Guidance	General additional guidance – the decision within levels e.g. - At each level, as well as content, the scientific coherency of what is stated will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	<u>Additional guidance</u> isolated facts about the resources, non-renewable or renewable OR the trend(s) in usage	<u>Possible candidate responses</u> coal is non-renewable and solar is renewable non-renewables are decreasing and renewables are increasing non-renewable resources are higher on (most of) the graph
Level 2	3–4	<u>Additional guidance</u> trend(s) AND limited explanation of the renewable trend OR limited explanation of the non-renewable trend	<u>Possible candidate responses</u> use of renewable resources is increasing because renewables are sustainable OR use of non-renewable resources are decreasing because they cause global warming
Level 3	5–6	<u>Additional guidance</u> both trends AND detailed explanation of one trend AND some explanation of the other trend	<u>Possible candidate responses</u> use of renewable resources are increasing and the use of non-renewable resources are decreasing because non-renewable resources are running out and wind turbines do not produce carbon dioxide

Q5.

Question number	Answer	Additional guidance	Mark
	<p>An explanation linking:</p> <p>lubricate/oil the wheels (1)</p> <p>(to) reduce friction (1)</p>	<p>make the toy car more streamlined / different surface / lubricate slope</p> <p>reduce air resistance / drag</p> <p>accept start from lower down the slope (1) (to) reduce the total amount of energy (transfer) (1)</p>	(2)

Question number	Answer	Additional guidance	Marks
(i)	<ul style="list-style-type: none"> idea that the source of energy is the sun (which is free) (1) 	ignore 'renewable'	(1)

Question number	Answer	Additional guidance	Marks
(ii)	One from: <ul style="list-style-type: none"> the setup / installing of the solar panels is not free (1) cost of materials involved (1) cost of maintenance (1) 	ignore 'expensive' by itself – must be qualified ignore 'pay electricity bills'	(1)

Question number	Answer	Additional guidance	Marks
(iii)	substitution (1) $2800 \div 1000$ answer (1) $2.8 \text{ (m}^2\text{)}$	allow rounded to 3 (m ²) (no power of ten error allowed here) award full marks for correct numerical answer without working	(2)